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ABSTRACT

The present study examines the impact of the Direct Instruction (DI) program on the high school careers of the economically disadvantaged students who participated in the DI model of Project Follow Through. The study involves six sites: East St. Louis; New York City; Flint, Michigan; Williamsburg County, South Carolina; and Uvalde, Texas. A preliminary analysis of the data shows that DI students are more likely to receive a high school diploma, are less likely to be retained in any grade, and show better attendance in ninth grade. The results do not show appreciable differences between ninth grade Follow Through and non-Follow Through students in achievement scores or high school grade averages, but such differences are likely to be concealed by the differences in retention and dropout rates. The six studies, though preliminary, consistently show that 3 or 4 years of an effective, academically oriented program in the primary grades had an enduring, positive impact on the academic aspects of students' lives. (BW)

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The Later Effects of Direct Instruction Follow Through:

Preliminary Findings

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Paper presented at American Educational Research Association; Montreal, PQ

April 1983

DRAFT

(These results are preliminary)

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Despite the controversy concerning the evaluation of Follow Through (House et al, 1978), if one accepts the premise that standardized achievment tests are a reasonable, (if imperfect) method to assess student learning, then it is relatively clear that the Direct Instruction model (Becker, Engelmann, Carnine & Rhine, 1981) was effective in significantly improving the academic performance of the low income students in 20 communities who participated in the program from kindergarten (or first) through third grade. (Becker, 1977; Bereiter & Kurland, 1981-82; Gersten, Note 1, Stebbins et al, 1977). The average scores for the students in the program corresponded to the 49th-50th percentile on (i.e. the national median) the Math, Language and Spelling Subtests of the Metropolitan Achievement Test and the 41st percentile in Reading. Of the nine major Follow Through approaches evaluated, Direct Instruction was the highest ranked in all academic areas but two (Spelling and Vocabulary), where it was second. There was also evidence that the model had a positive impact on the students' self esteem, and increased their sense of responsibility.

Yet, critics of the model assert that the effects of highly structured approaches such as Direct Instruction will dissipate overtime. According to this view, without the carefully sequenced lessons, and the careful teacher guidance during initial stages of learning, the students will not be able to work and learn independently. The only way to examine this issue is through longitudinal research, examining the later effects of the program.

Becker and Gersten (1982) examined the later effects of the program on fifth and sixth graders in five sites. Significant positive effects were found in every academic area. However, in most cases the magnitude of the effect was appreciably lower than it had been in the third grade. This is not altogether surprising. We concluded that students appeared to retain the knowledge and problem-solving skills they had mastered in the primary grades. They performed

better than comparable low-income children in their communities who did not attend the program. These enduring effects were strongest and most consistent in WRAT reading (word reading) math problem solving, and spelling. There were lesser effects in science, math concepts, math computation, and word knowledge; no significant effects were found in comprehension.

The fact that this study was conducted at five quite diverse sites for two grade levels and in two different years (1975 and 1976) adds confidence to the results. These results were from sites with a 3-year (first through third grades) rather than 4-year (kindergarten through third grade) program. For this reason in all likelihood, the results represent a low estimate of program effectiveness. A quasi-experimental follow-up study by Meyer, Gersten, and Gutkin, (in press) demonstrated that low-income fifth graders from the 4-year program in New York City were significantly outperforming comparison group children, and were well above national median levels in reading on the Comprehension Test of Basic Skills (CTBS). Also, Weber and Fuhrmann (Note 2) reported significant later effects in reading and math on the California Achievement Test for ninth graders who had completed the program; Follow Through graduates were .24 standard deviation units (or .8 grade equivalent units) ahead of comparable students in the district.

The present study examines the impact of the Direct Instruction (DI) program on the high school careers of the economically disadvantaged students who participated.

The study involves six sites; some had a 4 year Follow Through (FT) program (kindergarten through third grade), others only had a 3 year (first through third) grade program. Two sites offered a three year program in the early years

and later expanded to include kindergarten.

Of the six sites, four utilized a concurrent between groups design. The Non-Follow Through, or comparison, schools were matched with the Follow Through schools according to percentage of students receiving AFDC, ethnicity and reading scores prior to Follow Through. At these sites, only students in the Follow Through or Non-Follow Through program for three full years were included in the sample.

The remaining two sites utilized a time series design due to the unavailability of suitable matching schools. Data from the year immediately prior to the implementation of Follow Through and from the group which received two years of Follow Through were compared to groups receiving 3 or 4 years of Follow Through.

Hypotheses and Expectations

The following hypotheses (or expectations seemed reasonable) if, in a fact an above average academic program was presented to the young children:

1. The longer children stayed in the program, the better the performance measured at a later time. Thus, students in the four year program (K to 3) would tend to benefit more than students in a 3-year program.

2. The better the program is implemented, the greater the difference we would expect to see later.

3. The poorer the district's traditional program for the years following the intervention, the lower the overall performance for both Follow Through and comparison students at a later time.

Basically we believed that the more positive the initial learning experiences, the stronger the expected tendency for children to stay in school (rather than drop out). Although the program would interact with the quality of instruction received by the students in the succeeding 9 years, there should be

some lasting positive effects. The ability to read, and solve basic mathematical problems should benefit these students throughout the next 9 years. Results reported here are, in many cases, preliminary. In many sites, some students are still in high school -- thus final information on graduation, drop out rate, and college acceptance is not yet available. (It will be complete by August, 1983).

Preliminary Results

Urban Sites

In East St. Louis, the largest site, there are consistent positive effects in academic achievement (see Table 1). The most dramatic effects are found for the 1970-K starting group, the first to experience four full years of the Direct Instruction program. In Math, they are at the 29th percentile, while the other students from the district are at the 18th. In 9th grade Reading, they are the 40th percentile (almost grade level), while the comparison students are at the 26th percentile. In Language, they are actually above grade level (58th percentile vs. 35th for the comparison group). The three previous graduating classes also show significant effects in Reading, but not consistently in Math or Language.

The data also show that there were significantly fewer high school dropouts for the first group of Follow Through students. The dropout rate is 19 percent for the Follow Through students and 28 percent for the comparison group. Graduation/dropout results are still coming in for later groups.

New York City (Meyer & Gersten, Note 3). Preliminary results show significant positive effects favoring Follow Through students over the control group on several important measures. A larger proportion of DI Follow Through students

graduated from high school. Fewer FT students dropped out of school before graduating. FT students had higher 9th grade achievement scores; and the FT group had a higher percentage of students applying to college. The early results are summarized in Table 2.

The results for the 1970 group are still tentative; a reasonably high proportion of both Follow Through and comparison students were retained, and graduation/retention/college information is not yet available. Note that the Follow Through students median reading score for the 1969 group is within 2 months of grade level.

Flint, Michigan. Table 3 presents the achievement results for Flint, Michigan, along with the mean high school grade point average (GPA). The mean scale score for each subtest on the SRA Achievement Test is converted to a percentile. In both cohorts, Follow Through scores are higher in Reading, and the mean grade point average is higher. Follow Through students performed at a higher level than comparison students in Cohort III. Significant differences were found in Math and Composite Scores. Differences in Reading, Language and GPA approach significance. No significant differences were noted for Cohort I. It is quite likely the program was better implemented for Cohort III students. Teachers had two extra years to learn the model.

The ninth grade results for Cohort III Follow Through students are at the national median in Math, six years after the conclusion of the program. Their mean ninth grade Reading scores are at the same levels as their third grade standardized achievement scores, the 34th percentile. Direct Instruction students' achievement was significantly higher than the comparison students on both third and ninth grade tests in Cohort III.

For both cohorts in Flint, fewer Follow Through students were retained (34

versus 45 percent for Cohort I), 12 versus 35 percent for Cohort III. Significantly, more comparison students demonstrated attendance problems (10 or more absences) during the 1981-82 academic year.

Rural Sites

Tables 4a, 4b and 4c show some results from Cherokee, North Carolina. The DI Follow Through program was initiated in a BIA school in this Indian community in 1970, simultaneously for grades K, 1, and 2. The children who started kindergarten in 1969 were also studied for comparison. The results for Reading show a progressive improvement as the students received more years of Follow Through. In 9th grade, the Non-FT group was at the 7.9 grade equivalent, while the four-year FT group was at the 9.3 grade equivalent. The Language test (grammatical usage) fails to show a consistent trend, but all groups performed well on this test.

Tables 4a, a, c about here

Final graduation data for the Cherokee four-year FT groups will not be available until spring 1983, but the trend is toward a decreased dropout rate and increased graduation. Non-FT students (1969-K) had a dropout rate of 38 percent, the group with one year of DI was 37 percent, the two-year group 25 percent, and the three-year group 22 percent. These findings parallel their achievement scores at the end of third grade.

Williamsburg County, South Carolina is a rural, agricultural community. When Follow Through began, it had one of the highest illiteracy rates in the country. For those beginning first grade in 1969, the Follow Through group shows a significantly higher percentage of high school graduates, lower percen-

tage of dropouts, and higher rate of acceptance to college (see Table 6). (Note the percent graduates and percent dropouts do not add to one hundred because of retentions. Some retentions are yet to graduate.) Results are not significant for achievement differences. These may be hidden by dropout and retention differences.

Tables 5a and 5b about here

Uvalde, Texas (45 miles from the Mexican border) is one of the largest Follow Through Programs on the Direct Instruction Model. Over 99 percent of the Follow Through students are Chicano. Many enter first grade with little or no knowledge of the English language.

The DI Model was implemented in the first grades in Uvalde in the fall of 1968. This report covers a follow-up on the Chicano students who entered first grades in the fall of 1966, 1967, 1968, and 1969. The students from the two years prior to Follow Through are compared with those from the first two years of Follow Through. (A large number of students in all four of the annual clases moved out of the community. The percentages remaining in the community for the years 1966 to 1969 respectively, were 43.1%, 41.6%, 60.7%, and 44.1%. The figures given in the results reflect data of only the students who did reach high school for some period of time.)

A preliminary analysis of the high school data shows that the Direct Instruction students:

. Are more likely to receive a high school diploma.

. Are less likely to be retained in any grade.

. Show better attendance in 9th grade.

The results do not show appreciable differences between ninth grade Follow

Through and Non-Follow Through students in achievement scores or high school grade averages, but such differences are likely concealed by the differences in retention and dropout rates. If lower performing students are given an extra year to learn, they can make gains that would help to mask a Follow Through advantage. Similarly, most dropouts are from among those failing in school. This selective factor could also mask true Follow Through/Non-Follow Through differences.

Table 8 shows that a higher percentage of Follow Through students graduated than for the two preceding classes of students. It also shows that there were fewer retentions among Follow Through students, and especially after the first year.

High School attendance was also examined. DI students showed better attendance during 9th, but not 10th, 11th, and 12th grades. The dropout rate differences could be affecting the attendance differences. A student was considered to have good attendance if the student was absent for 10 or less days during the year.

SUMMARY AND CONCLUSIONS

These results are preliminary. Additional data is still coming in for students retained at some point in their careers, and further analyses are now being conducted. However, it is highly unlikely that the basic trends in the data will change appreciably when the new information is added.

The six studies consistently show that three or four years of an effective, academically oriented program in the primary grades had an enduring, positive impact on the students' lives ... at least on the academic aspects of their lives. At each site, there were positive effects in either the proportion of

students who successfully graduate from high school, or academic achievement scores.

Participation in the Direct Instruction Follow Through program tends to lead to a lower likelihood of a student dropping out, and a greater likelihood of applying to college. In many of the sites, positive effects are found in both measures.

There are a few patterns worth comments on. The two sites where no effects were found in achievement were both rural sites. Students entered with much lower language and academic skills than at the other sites. Though, the third grade reading scores and math achievement scores were significantly higher than one would expect, given the demographics, entry skills and performance of local comparison groups, (Gersten 1981), the absolute level of performance, when compared to national norms, was still quite low - corresponding to the 28th or 31st percentile. The 3 years of the program may not have been enough to have a serious impact on the student's performance on ninth or eleventh grade standardized achievement tests. On the other hand, the Follow Through experience was related to a reduced dropout rate, and in the case of the South Carolina site, an increased proportion of students apply to college.

On the other hand, at three sites - New York City, East Saint Louis and Cherokee - ninth grade Reading scores are within 9 percentile points of the national median. Third grade reading scores at these sites were also at (or around) grade level. This is an exciting finding. It is gratifying to see adolescents from one of the poorest sections in New York City (long known for its poor achievement) perform at grade level in reading in junior high, six years after the program ended. Generally, the 9th and 11th grade Reading scores are higher than the Math scores. Interestingly enough, the reverse pattern was true

in third grade. It appears that the math instruction in these districts, from fourth grade onwards (with the exception of Flint) is fairly weak.

The data from East Saint Louis and Cherokee seem to support the conclusion that the longer students were in the Direct Instruction program, the stronger the later effects. Students with four full years of the program appear to benefit the most.

There are disturbing aspects to these results as well. While the ninth grade reading scores were quite high for New York City, it is important to remember that 40 percent of these students dropped out of high school. Similarly, in South Carolina, despite the significant decrease in dropout rate, mean reading scores correspond to a sixth grade level.

Despite these caveats, the major conclusion is that positive effects were found at each of the six sites, and that the early intervention appears to have a significant, replicant impact on the students' future lives - at least when the early intervention approach is academically based and effective.

Table 1

East St. Louis Ninth Grade Achievement
(California Achievement Test, Level 5
Form B, 1970 edition)

		Follow Through					Comparison					
COHORT	BEGAN	%ile	Mean SS	S.D.	G.E.	N[a]	%ile	Mean SS	S.D.	G.E.	N	P
READING												
1	First in 68	22nd	489.4	71.4	7.3	118	17th	471.8	67.1	6.7	161	< .05
2	First in 69	20th	475.1	76.8	7.0	65	15th	463.0	76.8	6.4	173	= .05
3	First in 70	23rd	493.7	58.9	7.4	60	18th	474.5	62.5	6.8	141	< .05
3EK	K in 70	40th	538.0	72.6	8.8	54	26th	500.4	78.6	7.6	121	< .01
LANGUAGE												
1	First in 68	25th	498.1	93.1	7.3	114	234d	493.2	65.3	7.1	158	NS
2	First in 69	24th	495.4	108.0	7.2	63	19th	480.6	91.4	6.7	161	NS
3	First in 70	41st	542.9	90.8	8.9	56	33rd	522.8	70.6	8.1	137	= .05
3EK	K in 70	58th	583.0	97.2	10.2	51	35th	527.8	105.3	8.3	111	< .01
MATH												
1	First in 68	18th	473.4	77.5	7.2	114	14th	457.7	62.7	6.8	156	< .05
2	First in 69	15th	458.9	74.1	6.9	59	13th	453.2	72.8	6.7	161	NS
3	First in 70	19th	481.6	68.8	7.4	59	18th	475.5	67.4	7.3	141	NS
3EK	K in 70	29th	512.6	62.6	8.2	53	18th	475.1	85.3	7.3	117	< .01

[a] G.E. and %ile are conversion of MEAN SCALE SCORE

Table 2. New York City Results

	N	% Graduated	% Dropped Out	% Applied to College	9th Grade Reading	9th Grade Math
Began First Grade in 1969[1]						
Follow Through	23	56.5	39.1	39.1	9.5	8.0
Comparison	29	34.5	58.6	10.3	6.9	7.1
Began First Grade in 1970						
Follow Through	13	53.8	7.7	23.1	8.4	8.4
Comparison	33	33.3	48.5	21.2	7.7	7.8

1 Or Kindergarten in 1968

2 Or Kindergarten in 1969

Table 3

Flint, Michigan

Average High School GPA's and Ninth Grade Achievement Test Results on the SRA Test

	GPA		Reading		Math		Language		Composite	
Cohort-Grp	N	Mean	N	%ile	N	Mean %ile	N	%ile	N	%ile
Cohort I										
FT	79	1.89	74	29th	72	30th	71	28th	72	27th
Comp.	31	1.73	27	22nd	28	35th	28	32nd	25	30th
Cohort III										
FT	60	1.81[a]	51	34th	51	50th*	51	35th[a]	51	40th*
Comp.	39	1.55	28	25th	28	31st	27	25th	27	28th

* $p < .05$

a $p < .15$

Table 4c

Cherokee, N.C. Ninth Grade Achievement

(California Achievement Test, level 5, Form B, 1970 Edition)

Trend Analysis

	COHORT	YRS. FOLLOW THROUGH	%ile[a]	Median G.E.	Mean[b] NCE	N
READING	0	0 yrs.	28th	7.8	38	45
	1	2 yrs.	30th	8.0	40	67
	2	3 yrs.	38th	8.7	4.6	60
	3	4 yrs	46th	9.35	49	57
LANGUAGE	0	0 yrs.	49th	9.6	58	44
	1	2 yrs.	40th	8.7	46	67
	2	3 yrs.	32nd	8.0	43	60
	3	4 yrs.	48th	9.5	51	57
MATH	0	0 yrs.	31st	8.4	42	44
	1	2 yrs.	29th	8.2	40	67
	2	3 yrs.	31st	8.41	41	60
	3	4 yrs.	33rd	8.6	46	57

[a] %ile converted from Median G.E.'s

[b] mean NCE converted from Mean G.E.

Table 4a

Cherokee, N.C. 10th Grade Achievement

(California Achievement Test, level 5, Form B, 1970 Edition)

Trend Analysis

	COHORT	YRS. FOLLOW THROUGH	%ile[a]	Median G.E.	Mean NCE	N
READING	0[a]	0 yrs.	39th	10.0	45	46
	1[b]	2 yrs.	41st	10.1	45	62
	2	3 yrs.	39th	10.0	47	49
	3	4 yrs.	No 10th grade scores for this cohort			
LANGUAGE	0[a]	0 yrs.	47th	10.5	48	46
	1[b]	2 yrs.	47th	10.5	50	62
	2	3 yrs.	52nd	10.9	49	49
	3	4 yrs.	No 10th grade scores for this cohort			
MATH	0[a]	0 yrs.	21st	8.5	36	46
	1[b]	2 yrs.	40th	9.9	42	62
	2	3 yrs.	30th	9.1	42	49
	3	4 yrs.	No 10th grade scores for this cohort			

a Mean NCE for this cohort obtained by converting mean G.E.

b Mean G.E. for this cohort obtained by converting mean NCE.

Table 4b

Ninth & Tenth Grade

Cherokee N.C. on Student Status Data

GRADUATION AND DROPOUTS

COHORT	Yrs. Follow Through	% Graduation	% Dropped Out	N
0	0 yrs	47	38	93
1	2 yrs	47	37	106
2	3 yrs	34	25	104
3	4 yrs	a	22	105

a - scheduled for June 83 Graduation

Table 5a

Williamsburg County, S.C.
11th Grade Achievement

(Comprehension Test of Basic Skills, Level 1, Form 5, 1973 Edition)

		Follow Through					Comparison				
COHORT	BEGAN	&ile	Mean SS	SD	G.E.	N	%ile	Mean SS	SD	GE	N
	Reading										
2	First in 69	8th	484.0	82.6	6.6	88	8.2nd	489.5	86.3	6.8	54
3	First in 70	11th	507.1	65.3	7.4	81	9.5th	498.1	80.8	7.1	53
	Language										
2	First in 69	14th	494.3	78.9	7.0	88	15.4th	502.5	85.6	7.5	54
3	First in 70	21st	525.9	78.2	8.7	81	15th	479.7	84.0	7.3	53
	Math										
2	First in 69	9th	467.8	80.2	6.8	90	18.5th	512.5	70.6	8.4	54
3	First in 70	12th	481.6	65.1	7.2	53	16th	503.8	91.3	8.0	53

Table 5b

Williamsburg County, S.C.

Student Status Data on

GRADUATION, DROPOUTS AND COLLEGE ACCEPTANCE

COHORT	BEGAN	% Graduated	N	% Graduated	N	P
2	First in 69	83	127	71	71	< .05
3	First in 70	75	98	60	70	< .05

COHORT	BEGAN	% Dropped Out	N	% Dropped Out	N	P
2	First in 69	5	127	14	71	= .014
3	First in 70	7.3		6.8	70	NS

COHORT	BEGAN	% Accepted to College	N	% Accepted to College	N	P
2	First in 69	27	127	13	71	= .011
3	First in 70	30	98	31	70	NS

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